

WHAT IS CLAIMED IS:

1. A telescopic shaft for vehicle steering
which is assembled in a steering shaft of a vehicle
and in which a male shaft and a female shaft are
5 fitted to each other to be unrotatable and slidable,
comprising:

torque transmitting portions respectively
provided in an outer peripheral portion of said male
shaft and in an inner peripheral portion of said
10 female shaft for transmitting torque when they are
mutually in contact to rotate; and

preloading portion each consisting of a rolling
member provided between the outer peripheral portion
of said male shaft and the inner peripheral portion
15 of said female shaft at a position different from
that of said torque transmitting portion for rotating
when said male shaft and said female shaft are
relatively moved in the axial direction and an
elastic member provided adjacently to said rolling
20 member in the radial direction for applying preload
on said male shaft and said female shaft through said
rolling member.

2. A telescopic shaft for vehicle steering
25 according to Claim 1, wherein said torque
transmitting portions are always in contact to each
other.

3. A telescopic shaft for vehicle steering according to Claim 1, wherein each of said torque transmitting portions is comprised of an axial
5 protrusion formed on the outer peripheral surface of said male shaft to have a substantially arcuate cross section and an axial groove formed on the inner peripheral surface of said female shaft to have a substantially arcuate cross section.

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4. A telescopic shaft for vehicle steering according to Claim 3, wherein said torque transmitting portions are contacted to each other continuously in the axial direction.

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5. A telescopic shaft for vehicle steering according to Claim 1, wherein said torque transmitting portions comprise spline fitting portions or serration fitting portions formed on the
20 outer peripheral surface of said male shaft and on the inner peripheral surface of said female shaft.

6. A telescopic shaft for vehicle steering according to Claim 1, wherein:

25 each of said preloading portions comprises a first axial groove provided on the outer peripheral surface of said male shaft and a second axial groove

provided on the inner peripheral surface of said female shaft to oppose to said first axial groove; and

5 said rolling member and said elastic member are provided between said first and second axial grooves.

7. A telescopic shaft for vehicle steering according to Claim 1, wherein:

10 a plurality of said preloading portions are provided between said male shaft and said female shaft; and

15 a plurality of said torque transmitting portions are provided between two adjacent ones of said preloading portions.

8. A telescopic shaft for vehicle steering according to Claim 7, wherein said preloading portions are provided at intervals of 180° in the circumferential direction and each of said torque transmitting portions is provided between said preloading portions.

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9. A telescopic shaft for vehicle steering according to Claim 7, wherein said preloading portions are provided at intervals of 120° in the circumferential direction and each of said torque transmitting portions is provided between said

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preloading portions.

10. A telescopic shaft for vehicle steering according to Claim 9, wherein said torque
5 transmitting portions are provided at a central portion in the circumferential direction between said preloading portions.

11. A telescopic shaft for vehicle steering
10 according to Claim 1, wherein said rolling member comprises at least one spherical member.

12. A telescopic shaft for vehicle steering according to Claim 1, wherein said elastic member
15 comprises a leaf spring.

13. A telescopic shaft for vehicle steering according to Claim 1, wherein a solid lubricant film is formed in the outer peripheral portion of said
20 male shaft or in the inner peripheral portion of said female shaft.